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Sol-Gel Synthesis of Uniform Arrays of Ag and Au Nanoparticles

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Abstract. The obtaining of uniform arrays of silver and gold nanoparticles with a surface density up to $3.3 \cdot 10^9$ cm^{-2} on the zinc oxide buffer layers by sol-gel method is described. The variations of the solution composition and synthesis mode, layers coating and subsequent heat treatment were carried out. The absorption spectra of the obtained samples had a peak near 400–570 nm corresponding to the plasmon resonance in the Ag and Au nanoparticles. Wavelength and shape of Ag and Au nanoparticles plasmon peak varied depending on the synthesis mode: the use of ZnO buffer layers leads to an increase in the intensity of the nanoparticles plasmon peak, the annealing leads to a gradual decrease and broadening of the absorption peak of Ag and mixed Ag and Au nanoparticles arrays, but does not affect the peak of Au nanoparticles.

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